

### K44 CW Reader Settings or how to get the best copy out of your K44 CWR

- 1) *Make sure you enable the CWR !* The reader is initially disabled by default. Simply press the ALT Key and the F1 key together (ALT-F1) to turn it on. To save this setting as a default, press SHIFT-F3. You will see *CWR ON* displayed when it is toggled on.
- 2) *The K44 CWR does not like noise.* If you set the signal level properly, noise will be less of an issue. Before trying to copy any stations, find a frequency where there is no activity. If there is a lot of band noise, you may see the LEDs respond to the noise and climb up two or three LEDs. This is a bad setup. Use the K44's gain adjustment (SHIFT+ENCODER CCW) to reduce the gain until either the left LED never or just barely lights. A gain setting of 3 is a typical high noise setting but it is highly dependent on the signal level you feed into the K44. Once the gain is set correctly, you will find that the LEDs will respond accurately to CW signals and provide much better copy. There are times when signals are at the same level as the noise floor. In this scenario the CWR will usually not be able to produce good copy, so be aware of that.
- 3) *In quiet band conditions, find the optimal gain setting.* Find a frequency where there is no activity and adjust the CWR gain until the first LED just barely lights. Later, if you encounter very strong stations, you may have to reduce gain as described in the next paragraph.
- 4) *Avoid overloading the K44's CW decoder.* Too much gain can be just as bad as not enough. In general, you should set absolute maximum signal level to the point where the 5<sup>th</sup> LED on the right just barely lights when a station is tuned in. This is the point where signal clipping first occurs. While the K44 CWR handles overload pretty well, reducing the gain gives you the narrowest filtering. If the signal level increases beyond clipping, the 5<sup>th</sup> and 1<sup>st</sup> or 2<sup>nd</sup> LEDs will light at the same time. This is an extreme overload condition and can happen with very strong signals. You should back the CWR gain off to get the signal level under control. In extreme cases you may need to reduce the receiver's RF gain setting.
- 5) *How do I tune a station in ?* As you tune through a station sending CW you will see the LED array light from left to right and then return right to left. The point of maximum right movement, or peak, is where the station is optimally tuned. Depending on the strength of the signal, you may only see a deflection of 1 or 2 LEDs for a weak station or 4 or 5 LEDs for a strong station (see section 4). As long as the signal is peaked, the CWR will lock on and start decoding.
- 6) *The CWR has a fixed decode frequency.* The CWR filters and decoder is set to 725 Hz and can't be changed. This is the result of implementing complicated DSP algorithms in a small, low cost device, like the PsoC, which has limited memory and processing speed. We take advantage of several mathematical tricks which reduce the flexibility of the design thus the reason for the fixed decode frequency. Some folks worry about

situations where their receiver's passband is centered on some other frequency than 725Hz. In almost all cases, this can be resolved just by simply adjusting your receiver's passband setting. To do this, peak the CWR LED array on a CW station and then adjust the passband control to match. Please note that even though the CWR decode frequency is fixed, you will find there is quite a bit of allowance for tuning error.

- 7) *The CWR's noise filtering setting does matter.* This filter, adjusted by ALT-ENCODER, essentially controls the width of signal dropout correction. Dropouts are caused mostly by fast burst noise such as static crashes. These dropouts are very short in duration compared to the width of a CW dit or dah and can be filtered out automatically. The higher the filter setting, the more aggressively dropout reduction is employed. Not surprisingly, very high settings will distort the CW integrity and will result in copy errors, especially at higher CW speeds (25 WPM and above). Our recommendation is to leave the filter at the lowest setting and use it only when there is a great deal of atmospheric noise.
- 8) *A receiver's automatic noise blanker does not help.* Due to the way a noise blanker works, it really confuses the CWR and for that reason we suggest not using it. In addition, a fast AGC setting should also be avoided. Fast changes in signal level due to fast AGC attack and release will also confuse the CWR and affect copy. We suggest always using slow AGC.
- 9) *Narrow CW filters are not always worth using.* Narrow CW filters (200 and 400 Hz) do ring and distort the envelope of a CW station. If the detected element widths aren't correct then the CWR will make incorrect decoding decisions and decode letters incorrectly. The CWR has a built-in 6 pole narrow bandpass filter and in most cases this is all you really need. In crowded conditions, a good 2.3 KHz SSB filter with steep skirts does a good job in filtering out adjacent signals and will certainly help.
- 10) *All I get out of the CWR is gibberish.* We hear this from time to time and while not very descriptive, it could be caused by any of the above. Please review each one to be sure you understand the basics. Email us if you still have problems.

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